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COMPUTER SCIENCE

NEWSLETTER

No. 77

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Edited by Mr. C. Alan Ford

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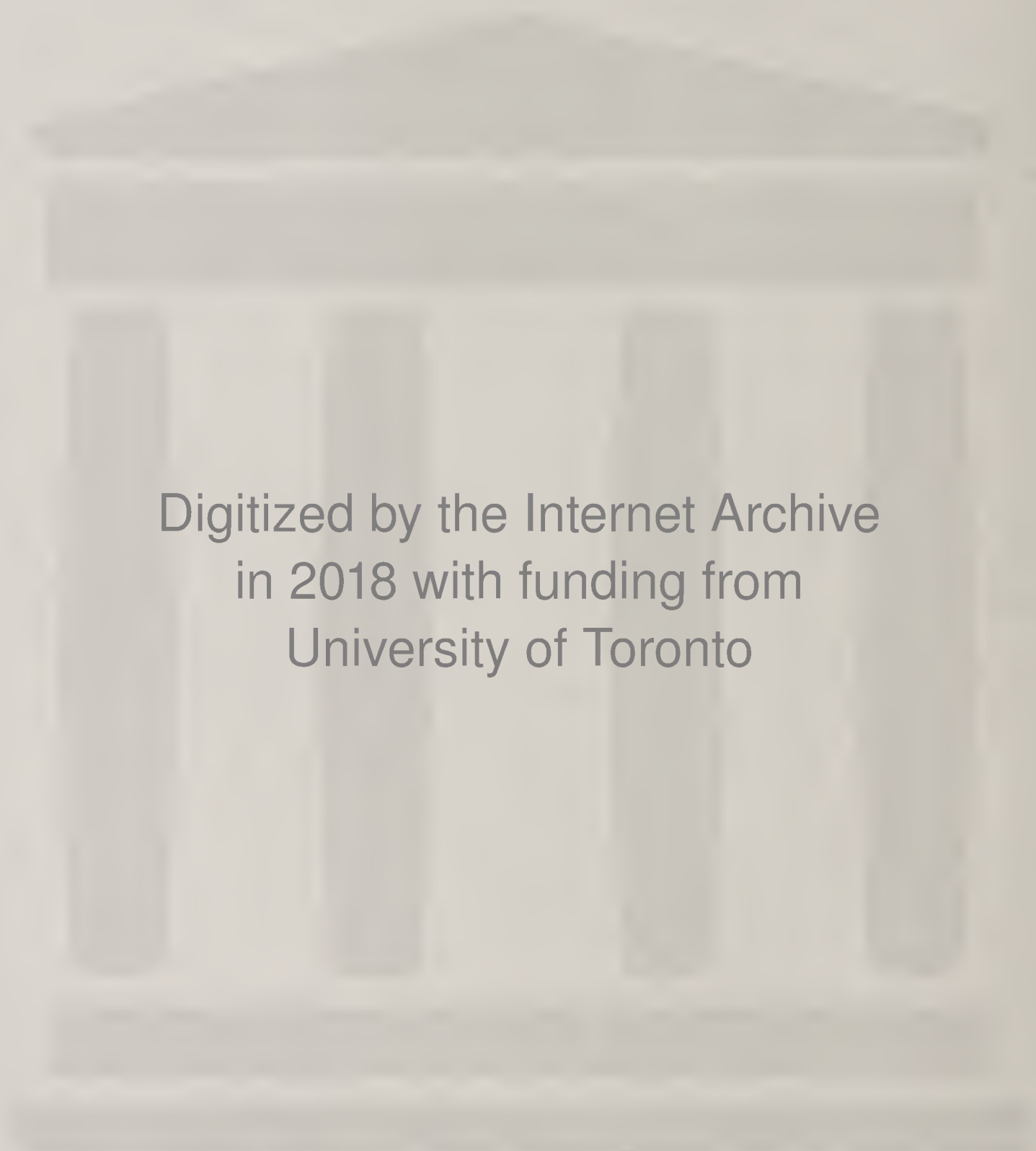
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PRICE LIST FOR 1971/1972

The price list proposed for effect during 1971/72 may be found attached to this Newsletter. It shows a few new priced items, a few price reductions, and only one significant upward revision.

The Centre has performed detailed studies of costs and of revenue prospects. These studies have built upon the work of 1970 by the Pricing Sub-committee of the Presidential Advisory Committee on Computer Policy and Planning. Experience with system performance during the 1971/72 season to date was also considered carefully.

The price list shown has been reviewed by the Pricing Sub-committee and referred to the PACCPP for approval. The Policy Committee of the Computer Centre and the Computer Users' Committee have also received the price list for their consideration and recommendation.

Because of new system facilities being instituted in July, some of the prices pertinent to S/360 job costs must persist for at least the month of July. Otherwise, this price list remains open for revision subject to the recommendations of the committees mentioned above.

THE SUGGESTION BOX

Suggestions continue to arrive at a rate of about ten per week. This month's crop point to issues about the site we occupy (5), software (8), input/output services (8), informational services (9) and miscellaneous (7). UTCC management continues to consider and respond to these on an individual basis. Several should be commented upon here.

The issue of personal bursting of jobs from the printer or pickup from shelves remains alive. Where this can be done cleanly it will be done (e.g., EUT and ASUT, other remotes in some circumstances). Some other situations make this quite impracticable, however, particularly whenever throughput is not on a FIFO basis.

A trial of vertically striated printer paper at EUT was well received. This type of paper will become standard early in July.

The use of PRINTOFF and PRINTON cards with WATFIV is urged as a way to reduce queuing at the HSJS printers. Some minor WATFIV bugs have been detected, for which fixes are expected or have been documented.

The use of these pages for advertising for part time programming jobs (or for part time programmers) was requested. See an item later in this issue.

NEW JOB ACCOUNTING FEATURES

The OS/MVT and HASP systems for the S/360-65 computers have been revised to give better and more complete information on the cost of individual jobs. The revised systems were given an exposure to the users through the device of a free day on June 22nd. The principal new feature is an end-of-job page which displays the billing quantities for the job, the price for these commodities, and the fully worked-out final price for the job. The OS job step information has been revised for clarity and compatibility with the end-of-job page.

The new systems show CPU and core pricing separately instead of merged.

The printouts with each job are believed to be fully self-explanatory. Users with questions or suggestions concerning these printouts are asked to make these known to any member of the Users' Service Group.

The new features require the incorporation of actual pricing factors into the system software. Provision of a working system at the beginning of July necessitates incorporation of the prices shown in the proposed price list, even though these have not received full committee sanction at the time of writing. Should any changes from the proposed price list be effected, these changes will be made to the systems for the beginning of the next practicable month.

COMPUTER SCIENCE CLUB

The Association For Computing Machinery Annual Conference (ACM '71) will be held August 3, 4, 5 in Chicago. Student members are particularly urged to attend. For a brochure, ACM membership form, or whatnot contact Mike Bauer (Secretary, Computer Science Club).

The Computer Science Club is trying to compile and publish a current summary of computer or computer-related work done by students at the Master's or Doctoral level. Computer related work outside the Department of Computer Science would be of particular interest. Any aid in this matter from interested students would be greatly appreciated. A half page summary would be sufficient. For further details contact Mike Bauer (Secretary, Computer Science Club), at 928-8725.

ON ADVERTISING FOR PROGRAMMERS OR PROGRAMMING TASKS

UTCC recently received a suggestion that the Computer Centre run advertisements in the Newsletter for people interested in writing programs or those wishing to have programs written. The Centre officially offers a contract programming service. However,

our overall interest is that programs are being written and we are happy to assist such activities. We shall therefore publish, free of charge, the names, addresses and phone numbers of people willing to write programs and those wanting to have them written. However, UTCC cannot participate in establishing terms of agreement between parties, or stand accountable for results.

OFFICE OF COMPUTER COORDINATION

The Committee of Presidents of the Universities of Ontario becomes the Council of Ontario Universities on July 1. The Computer Coordination Group, now domiciled in Ottawa, moves to the Council's address at 102 Bloor Street West, Toronto at that date and becomes the Office of Computer Coordination. M. P. Brown continues as Director.

SHARE XXXVII, NEW YORK, AUGUST 9 TO 13

Hotel registration forms are available in Room 105, Sandford Fleming, for the SHARE conference to be held in New York in August. Unfortunately, no agenda is yet available. This may arrive in the next few weeks and would also be available in Room 105. Users and associates of UTCC are welcome to attend SHARE conferences as representatives of our installation. SHARE represents the bulk of the installations which are equipped with large-scale IBM systems, particularly those with strong scientific applications interests.

"COMPUTER SCIENCE AND STATISTICS: FIFTH ANNUAL SYMPOSIUM ON THE INTERFACE", NOVEMBER 1 AND 2, 1971

A two-day meeting will be held at Stillwater, Oklahoma, open to all those who are interested in the relationships between computer science and statistics. The keynote speaker will be H. O. Hartley of Texas A & M University. Concurrent workshops will be conducted in five areas:

- Time Series and Stochastic Processes;
- Decision Sciences;
- Compumetrics;
- Computer Science and Statistics in Higher Education
- Computer Science and Statistics in the Extractive Industries;

The conference is being co-sponsored by Oklahoma State University, the University of Oklahoma, North Texas State University, the University of Tulsa, and by industrial firms in the area. Send inquiries to the conference chairman, Dr. Mitchell O. Locks, Oklahoma State University, Stillwater, Oklahoma 74074. Proceedings will be published.

UTCC STAFF CHANGES

Mr. Bill Hayes has recently been designated supervisor of the S/360 systems assurance function. Bill reports to Dr. Dave McNaughton, Manager of Operations. The purpose of systems assurance is to optimize the performance of the computer systems, hardware and software, particularly in the sense of reliability. The group works closely with both IBM and the UTCC programming staff in a continual striving for best performance. Mr. Dave Rauch, a long-time member of the operational staff, continues his system custodial duties with the new group.

Mr. Herb Kugel has moved into a full-time position with the Users Service Group, reporting to Mr. Williams. Herb has carried out a number of special assignments for the Centre recently, including the organization of the new assurance group. With USG, Herb's operational and system programming experience should work in happy combination with his well-known interest in the problems of the computer user.

Mr. Al Jones has joined the Operations group, with responsibilities for the service to remote terminals. Al has come to us from the University of Waterloo.

SYSTEM STATUS BULLETINS ISSUED

26:71	WATFIV Bug
27:71	Next SPSS Course Starts on Monday, May 31st
28:71:1	ALGOLW Update
2	Retiling of Floor at EUT
29:71:1	Job Accounting Changes for July 1971
2	Modified S/360 CPU and Core Pricing
30:71:1	Free Day on June 22, 1971, 9:00 a.m. to 5:00 p.m.
2	Prices for 1971/72
31:71	Procedure Library Update

A PROGRAMMING LANGUAGE (APL/360)

What Is It?

APL/360 time sharing system provides the user at a Communications Terminal with an extremely concise and powerful programming language. Many computer operations can be accomplished by single APL operators; manipulations on arrays (groups of data) of varying size and shape extend in a very simple way from operations on scalars (single item variables). The APL/360 system provides facilities for creating, editing and debugging algorithms as well as for immediate calculation of (complex) expressions. APL/360 is based on a notation defined by Dr. K. E. Iverson (A Programming Language, John Wiley & Sons, Inc., 1962).

Availability

APL/360, operating in S/360 No. 1, will become available to users on July 3, 1971. The hours of service will be:-

Weekdays 9:30 a.m. - 4:45 p.m.
7:30 p.m. - 6:45 a.m.

Saturday and Sunday

9:30 a.m. - 4:45 p.m.

NOTE: Service after 3:00 a.m. may on occasion be preempted for specially scheduled work.

Getting an Account

Users may obtain an APL account from Mrs. C. Pidcock, Sandford Fleming, Room 115A (928-8703). APL service prices are included in the 1971/72 UTCC price list attached to this Newsletter.

Accessing APL

Users with dial-up terminals may access APL by dialing 928-7200. Users with leased line terminals who wish to transfer their lines to APL should contact Mr. S. Goldfarb at 928-3787.

Two dedicated APL terminals are available in Room 109, Sandford Fleming for public use. In addition, a dial-up terminal also located in Room 109 may be used for APL.

APL key transfers which can be stuck onto the fronts of the terminal keys are available from Mrs. C. Pidcock (928-8703).

Manuals and Reference Books

APL User's manuals will be provided to anyone obtaining an account code or renting a terminal from UTCC. Ask for one. The book "APL/360, An Interactive Approach", Gilman and Rose (Wiley), is recommended to the new user.

Inquiries

Items of general interest and APL special announcements will be maintained in APL public library 1, workspace NEWS. The workspace may be accessed through APL by typing

)LOAD 1 NEWS

An index of items can be obtained by typing

INDEX

Individual items may be printed by typing

PRINT n

where n is the index number of the item. Any further inquiries may be directed to Mr. S. Goldfarb at 928-3787.

CHANGES AT THE UNDERGRADUATE TERMINALS

Have you been to the Engineering Undergraduate Terminal recently? Obvious changes have been made to the terminal hardware configurations which should speed more programs through and cut down the lineups.

The keypunch area will be consolidated in Room 115 (the terminal room) and the program preparation area is tentatively scheduled to go in Room 119 (the present keypunch room). This move will put the noise into one area, and leave the 'thinking' area quiet.

In addition to the above changes new furniture will be installed and the rooms generally 'spruced' up.

A suggestion box has been installed in the terminal room. We encourage you to use it. This is a quick and sure method of communicating your ideas to us.

Effective June 30/71, ASUT will close for the summer. The reason for this closure is twofold. First, the usage has historically not been high enough during the summer months to warrant leaving it open. Secondly, this gives an opportunity to make some improvements to the ASUT area.

ASUT will reopen on or about Sept. 1/71. The exact date and hours of service will be advertised as soon as they have been set. Meanwhile, the EUT will be open in the evenings from 7:00 p.m. to 10:00 p.m.

UTCC is making a concerted effort to more effectively serve the high speed terminal users. Your suggestions and criticisms are welcomed.

TIMING STUDIES ON WATFIV

Some users have questioned the decision to limit the execution time available to WATFIV jobs on the High Speed Job Stream to 10 seconds. Consider, however, this study which has been made of what can be done in that time. The study was suggested by the article "Two Seconds on the Debug Terminals" by D. Burkett, in the November 1970 issue of the Waterloo Newsletter. However, while the same subroutines were used in several cases, the programs are not the same. The study is not intended to be a direct comparison between the Toronto and Waterloo systems.

The study showed that in 10 seconds or slightly less any one of these programs could be run:

- find the determinant of a 37 x 37 matrix (using the WATLIB subroutine DETMAS);
- evaluate a polynomial of degree 20 at 12,000 points using direct substitution;
- sort 3460 integer numbers (using IRANK);
- find the inverse of a 33 x 33 matrix (using MINVRS);
- solve a system of 36 simultaneous linear equations (using LNEQNS);
- find the square roots of 35,000 numbers (using SQRT);
- generate 108,000 random numbers (using RANDI);
- find the mean, variance and standard deviation for 70,000 numbers by direct calculation.

The first 1,430 prime numbers were also found in only two seconds using "the sieve of Eratosthenes" (the comparison for 10 seconds was impossible because the array required was too large!)

Statistics on HSJS service have shown that one third of all jobs compile in less than 0.05 seconds and virtually none reach one second. Two thirds of all jobs execute within 3 seconds and virtually none exceed 5 seconds. Most jobs require less than 14K program storage and 9K of array storage of the 45K available.

The Terminals serve these main purposes: running relatively small jobs and debugging. Remembering that compilations are not limited by time and lines, only by the size of the symbol table, we suggest debugging at ASUT or EUT and processing larger production runs in the regular S/360 job stream.

KEYPUNCH MAINTENANCE ASSISTANCE

UTCC now offers a maintenance phone service as an aid to on-campus users supporting keypunches. The purpose of this phone service is to help define the actual machine problems as well as to spot the machine's exact location.

It should be noted that IBM still carries out the actual service. UTCC acts only as a phone contact, through the number 928-6465. Direct your questions or suggestions concerning this service to the I/O Supervisor, Roy Finlayson, at 928-7092.

RENEWAL OF BOX SPACE

The deadline for renewal of user box space is July 1st. However, a month's grace period will be allowed before any boxes are removed. The present users will have first chance at the space and if there is any in excess it will be assigned on a first come basis. If you wish to reserve space please see Miss Nancy Okada, Room 107 Sandford Fleming Building, or call 928-2988.

SUBMISSION OF CREDIT REQUESTS

All credit requests of an operational nature should go to Roy Finalyson, Room 112 Sandford Fleming.

If submission is not possible during normal working hours, the above requests may be submitted to input/output area personnel in Room 109, Sandford Fleming.

This procedure is designed to speed the servicing of these requests.

PRODUCTION STATISTICS

The departure of the student course-work load shows in a slump on all systems (Table I). These overall seasonal decreases of 43% are almost identical to the 42% slump at this time last year.

The S/360 job load has grown 36% since last year (Table II). The average job is now much larger in core region and execution time than a year ago. This increase in productivity reflects very favourably upon the addition of extra high speed core to the second S/360.

SYSTEM	MARCH	APRIL	MAY	MAY/APR CHANGE
S/360	23,864	19,598	17,669	-10%
7094	1,690	1,293	1,077	-17%
HSJS	78,834	48,756	20,870	-57%
TOTAL	104,388	69,647	39,616	-43%

TABLE I: Number of Jobs Processed; Mar, Apr, May, 71

SYSTEM	MAY '70	MAY '71	71/70 CHANGE
S/360	12,976	17,669	+36%
7094	2,820	1,077	-62%
HSJS	24,669	20,870	-15%
TOTAL	40,465	39,616	- 2%

TABLE II: Comparison of May 70 with May 71

CREDIT REQUEST SUMMARY

	THIS MONTH			LAST MONTH
	S/360	7094	TOTAL	TOTAL
HUMAN	22	1	23	36
SOFTWARE	7	0	7	7
HARDWARE	8	1	9	9
TOTAL	37	2	39	52
			0.20%	0.25%

The absolute and relative incidence of credit claims has again been reduced. The expansion of use of the second S/360-65 and the increasing length of typical S/360 jobs have exposed a couple of problem areas, keeping S/360 claims higher than had been expected. Solutions or bypasses are under development in supporting software facilities or in operational techniques.

SYSTEMS RELIABILITY

The reliability of the S/360 systems for April and May are shown in the following table for comparison.

SYSTEM	MONTH	UPTIME	MTBF
S/360 #1	April	99.3%	23.8 hrs.
	May	98.3%	23.4 hrs.
S/360 #2	April	93.3%	10.6 hrs.
	May	98.5%	27.5 hrs.

Uptime decreased slightly on System #1 as a result of air conditioning and electrical power failures. The Computer console typewriter also caused trouble.

Uptime increased noticeably on System #2. This was expected since troubles with a loose cable on a data channel and teething troubles with the new block of fast core were resolved in late April.

SUMMER HOLIDAY WEEKEND SCHEDULE

The following are the Computer Centre hours of operation scheduled for the holiday weekends throughout the summer months.

July 1st Holiday

The Computer Centre will be closed from 1:00 a.m. Thursday, July 1st until 9:00 a.m. Saturday, July 3rd. Normal weekend service will be provided on Saturday, July 3rd and Sunday, July 4th between 9:00 a.m. and 5:00 p.m.

August 2nd Holiday

The Computer Centre will be closed from 5:00 p.m.** Sunday, August 1st until 9:00 a.m. Tuesday, August 3rd.

September 6th Holiday

The Computer Centre will be closed from 5:00** Sunday, September 7th, until 9:00 a.m. Tuesday, September 8th.

** Normal weekend service between 9:00 a.m. and 5:00 p.m. on Saturday and Sunday will be provided during July, August, and early September. If the work load is extremely "light" on weekends in the summer, the Computer Centre may close on Sundays. If this is the case, the Computer Centre will close at 5:00 p.m. on Saturday preceding the August 2nd and September 6th Holidays.

1. RATE SCHEDULE FOR THE UNIVERSITY OF TORONTO, 1 JULY 1971

A. SYSTEM/360 SERVICE - The General Purpose Job Stream

JOB CHARGE = $SF((\$CPU * CPUTIME) + (\$CORE * COREUSAGE) + UR + PDC)$

where: SF = Service Factor of 2.00 for RUSH
1.00 for ASAP
0.60 for IOI

\$CPU = \$2.00 per CPU minute

CPUTIME = measured CPU time in minutes

\$CORE = \$1.20 per hundred kilobyte minutes
of core usage

COREUSAGE = $(RA/100) * (1 + RA/500) * ERT$

RA = Region Allocated (KB)

ERT = Equivalent Run Time (in minutes)
= CPUTIME + I/O WAITTIME

I/O WAITTIME = $(.0266 \text{ sec. per I/O event}) * 60 \text{ min.}$

UR = Unit Record Service Charge

= \$0.80 per thousand cards read,
plus
\$0.80 per thousand lines printed,
plus
\$2.00 per thousand cards punched

PDC = Peripheral Device Charge

= \$4.00 per job requiring disk, tape,
or special printer set-up

B. 7094 11/1401 SERVICE

Computation (7094) = \$96.00 per system hour

Unit Record Service (1401) = \$0.80 per thousand cards
read, plus
\$0.80 per thousand lines
printed, plus
\$2.00 per thousand cards punched

C. INTERACTIVE TERMINAL SYSTEMS SERVICE

1. Conversational Programming System (CPS and CPS/RJE)
\$2.00 per CPU minute, plus
\$1.20 per core page per hour, plus
\$3.00 per connect hour
2. Administrative Terminal System (ATS)
\$3.60 per connect hour
3. APL Service
\$3.00 per CPU minute, plus
\$3.00 per connect hour
4. IBM 2741 Typewriter Terminal Rental
\$95.00 per month for a leased line, or
\$105.00 per month for a dial-up line

(This rental is not payable in allocated or subsidy funds; it is a real dollar charge).
5. Disk Storage Space
\$0.30 per track per month for ATS permanent storage records, APL workspaces, and CPS load/save and file space

D. MISCELLANEOUS

1. SYSTEM/360 On-line Disk Storage

\$0.30 per track per month

NOTE: 7294 bytes = one track
20 tracks = one cylinder
200 cylinders = one 2316 disk

(The minimum is one month and the charge is payable in advance).

2. Disk Pack Rental (off-line)
\$25.00 per month

(The minimum is one whole disk pack for one month and the charge is payable in advance).
3. Disk Pack Storage

\$25.00 initial charge, plus
\$10.00 annual renewal
4. Disk to Tape Backup

\$20.00 per cycle
5. Tape Rental

\$1.00 per tape per month

(The minimum is one month and the charge is payable in advance).
6. Tape Storage

\$5.00 initial charge, plus
\$1.00 per tape per month
7. Tape Cleaning and Testing

cleaning = \$1.50 per tape (double pass)
testing = \$2.00 per tape
8. Negotiated Contract Services

Job turnaround handling = \$10.00 per man hour
Programming Assistance = \$12.00 per man hour
Analytical Assistance = \$15.00 per man hour

(These services are not payable in allocated or subsidy funds; they are real dollar charges).
9. PDP-8/s System Services

\$25.00 per hour
10. CALCOMP Plotting

\$20.00 per plotter-hour

11. Card Processing

Reproduction	= \$2.00 per thousand cards
Interpretation	= \$2.50 per thousand cards
Reproduction and Interpretation	= \$3.50 per thousand cards
Labels	= \$5.00 per thousand cards
Listing	= \$1.00 per thousand cards
Keypunching	= \$5.00 per hour
Keypunch Verifying	= \$5.00 per hour